CLAIMS

What is claimed is:

1   1.   A method comprising:

2   labeling each received network packet with information identifying an

3   associated flow and a queue in which the packet will await transmission;

4   mapping each packet into one of a plurality of queues to await transmission

5   based on the packet's label identifiers;

6   scheduling the packets in the queues for transmission;

7   encapsulating the packets to form frames of uniform size; and

8   transmitting the uniform frames through a switch fabric to a next destination.

1   2.   The method of claim 1, further comprising decapsulating a received frame of

2   encapsulated packets.

1   3.   The method of claim 1, wherein labeling each packet to identify an associated

2   flow and a queue in which the packet will await transmission comprises determining a

3   flow associated with the packet based on the packet's source address and

4   destination address.

1   4.   The method of claim 3, wherein labeling each packet to identify an associated

2   flow and a queue in which the packet will await transmission comprises determining a

3   flow associated with the packet based on protocols associated with the packet.

1   5.   The method of claim 1, wherein labeling each packet to identify an associated

2   flow and a queue in which the packet will await transmission comprises determining a

3   traffic class to which the packet belongs.

1   6.   The method of claim 1, wherein encapsulating the packets to form frames of

2   uniform size comprises encapsulating the packets to form frames of uniform size and

3   adding headers that contain information for decoding each frame back into packets.

1   7.   The method of claim 1, wherein encapsulating packets to form frames of

2   uniform size comprises encapsulating packets to form frames of uniform size by

3   merging multiple packets into one frame using multiplexing.

1   8.   The method of claim 1, wherein encapsulating packets to form frames of

2   uniform size comprises encapsulating packets to form frames of uniform size by

3   segmenting a packet and placing the packet segments into multiple frames using

4   segmentation and reassembly.

1   9.   An apparatus comprising:

2   a classification element to label packets received from a network with

3   information identifying an associated flow and queue;

4   a mapping element coupled to the classification element to place the packets

5   into one of a plurality of queues based on the packet's label identifiers;

6   a scheduler coupled to the mapping element to schedule the packets in the

7   queues for transmission; and

8   an encapsulation element coupled to the scheduler to encapsulate the

9   scheduled packets into uniform size frames before the packets are transmitted

10   through a switch fabric to a next destination.

1   10.   The apparatus of claim 9, further comprising an access unit coupled to the

2   classification element through a switch to provide access to communications from the

3   network.

1   11.   The apparatus of claim 9, further comprising an adjunct unit to perform signal

2   processing functions.

1   12.   The apparatus of claim 9, further comprising a switch coupled to the

2   encapsulation element to transmit the scheduled packets to the next destination

3   through the switch fabric.

1   13.   An article of manufacture comprising:

2   a machine accessible medium including content that when accessed by a

3   machine causes the machine to:

4   label each received network packet with information identifying an associated

5   flow and a queue in which the packet will await transmission;

6   map each packet into one of a plurality of queues to await transmission

7   based on the packet's label identifiers;

8   schedule the packets in the queues for transmission;

9   encapsulate the packets to form frames of uniform size; and

10   transmit the uniform frames through a switch fabric to a next destination.

1   14.   The article of manufacture of claim 13, wherein the machine-accessible

2   medium further includes content that causes the machine to decapsulate a received

3   frame of encapsulated packets.

1   15.   The article of manufacture of claim 13, wherein the machine-accessible

2   medium further includes content that causes the machine to remove one or more

3   layer encapsulations from the received packet.

1   16.   The article of manufacture of claim 13, wherein the machine accessible

2   medium including content that when accessed by the machine causes the machine to

3   label each received network packet to identify an associated flow and a queue in

4   which the packet will await transmission comprises machine accessible medium

5   including content that when accessed by the machine causes the machine to

6   determine a flow associated with the packet based on the packet's destination

7   address and protocols associated with the packet.

1   17.   The article of manufacture of claim 16, wherein the machine accessible

2   medium including content that when accessed by the machine causes the machine to

3   label each received network packet to identify an associated flow and a queue in

4   which the packet will await transmission comprises machine accessible medium

5   including content that when accessed by the machine causes the machine to

6   determine a flow associated with the packet based on ports associated with the

7   packet.

1   18.   The article of manufacture of claim 13, wherein the machine accessible

2   medium including content that when accessed by the machine causes the machine to

3   label each received network packet to identify an associated flow and a queue in

4   which the packet will await transmission comprises machine accessible medium

5   including content that when accessed by the machine causes the machine to

6   determine a traffic class to which the packet belongs and classify the packet into one

7   of a queue to await transmission based on the traffic class to which the packet

8   belongs.

1   19.   The article of manufacture of claim 13, wherein the machine accessible

2   medium including content that when accessed by the machine causes the machine to

3   encapsulate the packets to form frames of uniform size by grouping small packets

4   and segmenting large packets comprises machine accessible medium including

5   content that when accessed by the machine causes the machine to encapsulate

6   packets to form frames of uniform size by merging multiple packets into one frame

7   using multiplexing.

1   20.   The article of manufacture of claim 13, wherein the machine accessible

2   medium including content that when accessed by the machine causes the machine to

3   encapsulate the packets to form frames of uniform size by grouping small packets

4   and segmenting large packets comprises machine accessible medium including

5   content that when accessed by the machine causes the machine to encapsulate

6   packets to form frames of uniform size by segmenting a packet and placing the

7   packet segments into multiple frames using segmentation and reassembly.

1   21.   A system comprising:

2   an access unit to provide access to communications from a network;

3   a switch coupled to the access unit to receive and transmit packets;

4   a classification element coupled to the switch to label packets received from

5   the network with information identifying an associated flow and queue;

6   a mapping element coupled to the classification element to place the packets

7   into one of a plurality of queues based on the label identifiers;

8   a scheduler coupled to the mapping element to schedule the packets in the

9   queues for transmission to a next destination;

10   an encapsulation element coupled to the scheduler to encapsulate the

11   scheduled packets into uniform size frames; and

12   a switch fabric coupled to the switch via which scheduled encapsulated

13   packets are transmitted to the next destination.

1   22.   The system of claim 21, further comprising an adjunct unit coupled to the

2   switch to perform digital signal processing (DSP) functions.

1   23.   The system of claim 21, wherein the switch is a PCI-Express/Advanced

2   Switching switch.

1   24.   The system of claim 21, wherein the switch fabric is a PCI-Express/Advanced

2   Switching fabric.

1   25.   The system of claim 21, wherein the switch fabric is an Ethernet fabric.

1   26.   The system of claim 21, wherein the switch fabric is an InfiniBand fabric.